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Older adults frequently deploy the concept of distrust when discussing digital technologies, and it is tempting to assume that distrust is largely responsible for the reduced uptake by older adults witnessed in the latest surveys of technology use. To help understand the impact of distrust on adoption behavior, we conducted focus groups with older adults exploring how, in what circumstances, and to what effect older adults articulate distrust in digital technologies. Our findings indicate that distrust is not especially relevant to older adults' practical decision making around technology (non-)use. The older adults in our study used the language of distrust to open up discussions around digital technologies to larger issues related to values. This suggests that looking to distrust as a predictor of non-use (e.g. in Technology Acceptance Model studies) may be uniquely unhelpful in the case of older adults, as it narrows the discussion of technology acceptance and trust to interactional issues, when their use of distrust pertains to much wider concerns. Likewise, technology adoption should not be viewed as indicative of trust or an endorsement of technology acceptability. Older adults using-while-distrusting offers important insights into how to design truly acceptable digital technologies.

CCS Concepts: • **Human-centered computing** → **User studies**; **User studies**; *User models*; *HCI theory, concepts and models*; **User studies**; *User models*; **User studies**; *User models*; *HCI theory, concepts and models*; **User studies**; *User models*; *HCI theory, concepts and models*; Accessibility theory, concepts and paradigms; • **Social and professional topics** → **Seniors**; **Seniors**;

Additional Key Words and Phrases: Aging, ageing, trust, adoption, technology acceptance model (TAM), inclusive design

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1 INTRODUCTION

The 'digital divide' in the frequency and diversity of technology use between the old and young has been a topic of concern within HCI for at least twenty years, and remains relevant even as more tech-savvy generations enter retirement age. The notion that the increased prevalence of digital technologies in people's working lives will lead to a 'Silver Tsunami' of retirees capable of being equal participants in digital society has not been borne out in recent surveys [23]. Despite greater percentages of older adults now being online, their breadth of uptake of digital technologies [23],

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amount and quality of engagement in these tools [23, 72], and ability to "critically engage with the online world" [9] lag behind younger generations.

During prior interviews and workshops with older adult participants [13], the theme of 'trust'—or more accurately, 'distrust'—emerged spontaneously as an explanation for non-use. Most consistently, distrust was cited as the primary cause of older adults' resistance to online banking: "Don't trust it. Won't do online banking, that's all. Don't trust anything like that." Part of this distrust was due to security concerns (e.g. hacking), but part was rooted in a lack of confidence in one's ability as a user: "I'd be frightened to press the wrong thing online." Participants described a lack of trust in online communication (including submission of forms): "No, I'd rather speak to a person…I supposed you'd call it old fashioned, but…." They also cited distrust in the reliability of websites due to their being convincingly mimicked: "It's very crafty because the form— [interrupted by] Oh, everything looks the same. The logo, even." And in many instances, participants reported a more diffuse distrust, a lack of confidence in being able to determine which information, site or service was trustworthy: "The trouble is, it's knowing the difference, isn't it?"

Older adults' stated distrust of digital technologies should come as no great surprise. The Over 65s are frequently characterized as both distrustful of digital technology [77, 82] and vulnerable to malicious agents who exploit their lack of online savviness [14][1]—characterizations, it should be noted, that older adults themselves are all too familiar with. But to what extent is trust an especially salient consideration when designing digital technologies for this specific demographic?

In this paper we report the findings of three sets of focus groups designed to elicit insights into how, in what circumstances, and to what effect older adults articulate distrust in digital technologies. Technology Acceptance Model (TAM) literature proposes that people evaluate relevant factors, some of which pertain to trustworthiness, in order to reach a decision about whether or not to use a given technology. To what extent, then, might the digital divide result from generational differences in attitudes regarding the trustworthiness of digital technologies? And if these attitudes do affect usage, why might older adults distrust digital technologies more than younger adults? Contrary to expectations, in attempting to answer these questions we did not find evidence that distrust leads to non-use among the older adult participants in our study. Instead, we find that language deployed for reasoning about use and non-use—e.g. 'trust' and 'distrust'—serves to account for one's own technology interactions in relation to normative expectations. We find that distrust is cited as an appropriate and sufficient justification for non-use when older adults have the freedom to reject technologies they do not find valuable; whereas when non-use is not viable—for example, when technologies are too valuable not to use—distrust is articulated as a form of protest against aspects of that technology that arouse concern. We argue that it is these concerns, irrespective of the eventual use/non-use outcome, that should draw serious consideration from designers of digital technologies.

2 RELATED WORK

There is a long tradition in HCI of exploring accessibility barriers to technology adoption for older adults, too numerous to list. And yet, cognitive and physical decline commonly associated with aging do not apply in all instances of technology non-use. While older adults should not be discussed as if they are a homogenous group [30, 81]—indeed, they are arguably a *more* diverse demographic than younger adults [27, 56]—work looking at older adults' patterns of technology use have identified specific attitudes to digital technologies that would, on face value, appear to explain reduced uptake of these technologies by older adults in comparison with younger adults when there

[1]This is contradicted by Kolimi, Zhu and Carpenter [2012] who find that because older adults are more fearful of identity theft they are more careful than younger adults not to disclose private information online.

are no apparent accessibility barriers to use. For example, older adults are typically apprehensive of conducting financial transactions online, viewing online banking as untrustworthy and too risky to use [71, 79]. On the whole, they demonstrate greater concern about privacy and security than younger generations [60], and are more fearful of risks associated with security breaches [15]. They are distrustful of online health information [87]. And they see social networking sites as dangerous and/or fostering unacceptable behaviors [42]. By resisting digital technologies, older adults do not reap the same myriad of benefits as younger generations (often not even benefitting from tools designed specifically for them [84]), reduce their ability to contribute to the so-called "information society" [42], and potentially limit their own opportunities to participate in public discourse [9].

That is one narrative within the literature. Another contradictory narrative is that older adults are by and large receptive to digital technologies [16, 49, 52], and frequently find new uses for digital technology in post-retirement life [12, 48, 76, 86]. Older adults can be enthusiastically engaged in using and co-creating digital technologies that meet their actual needs and requirements [11, 46, 68, 83], suggesting that technologies should be designed to support alternative goals as defined by older adults [45]. Indeed, older adults will immediately adopt technologies when genuine needs arise [26]. And if there is a perceived utility in sharing information about their behavior, older adults are somewhat more willing to share this information than younger adults [4] (cf. [47]). Consequently, there have been recent calls for a more holistic view of designing for older adults, moving away from deficit/compensatory models of designing for aging [68, 81] towards designing for "late-life development", growth and reflection [12]; for life-affirming activities [68]; and with an awareness of the larger socio-technical context into which these technologies are deployed [76, 84]. In particular, Vines et al. [2015] argue for a discursive shift in the HCI community away from stereotypes of older adults which narrowly constrain conceptions about appropriate technologies for them, and propose involving older adults in actively shaping the HCI research agenda.

In light of these seeming contradictions in the literature, we set out to understand whether older adults' attitudes toward digital technologies, specifically their assertions of 'distrust', corresponded meaningfully with technology non-use. Trust and distrust have been a popular topic for investigation in HCI—for older adults as a distinctly interesting user group, as above, as well as for typical users of unspecified age (generally young, working adults). Alongside the commonly measured perceptions of a technology's usefulness, ease of use and risk [20], trust has been explored as a relevant factor in adoption for engagements such as e-commerce [25, 65], e-government [6, 33], online recommendation agents [7], organizational information systems [44], and social networking [41]. In light of these findings, there have been various efforts to integrate trust into Technology Acceptance Models. So-called 'Trust-TAM' approaches tend to advocate a hybrid model of trust as being comprised of *technology trust* (cf. [50]) and *interpersonal trust*; i.e. a user approaches a new technology with expectations for the technology's performance (its functionality, reliability and helpfulness) as well as expectations about the human agents behind the technology (their competence, integrity and benevolence) [41]. In regards to the interpersonal dimension, there has been much interest in the fact that certain trust signals that people rely on in face-to-face communication cannot be gleaned from online communication, which complicates and potentially impedes technology mediated interpersonal trust-formation [69].

But diagnosing and responding to ostensible trust deficits in older adults, and in designing to foster trust in general, the language use surrounding the subject of 'trust' may in fact be richer than is often foregrounded in HCI work. That richness is not interesting in and of itself, for this investigation anyway; but by not attending to this richness, important aspects of interacting with digital technologies are too narrowly understood. In particular, categories that represent a type of person, e.g. "older adult", carry certain common sense understandings about orientations

to digital technologies (right or wrong) even before those orientations are described during an interview. For example, Harper et al. [2017] show that homeless individuals' reference to the category 'homeless' conveys a commonly understood relationship to connectivity, which become interwoven in their reasoning about non-use of digital technologies (such as Skype) for enabling connectivity. Similarly, we argue that post hoc reasoning about technology non-use elicits a certain affinity with the category of 'older adult' that is not necessarily felt in other situations: broadly shared characteristics for this group which are believed to differ from 'younger' individuals are drawn on in order to make sense of one's adoption behavior. Within the HCI literature, this is most strongly supported by Kania-Lundholm and Torres [2015], who use "positioning theory" to explain how older adults reify the digital divide through their association with a membership category to which reduced technology use expectations are ascribed.

In seeking out evidence of reasoning about trustworthiness by older adults in their interactions (or not) with digital technologies, we found that the concept of distrust is deployed in ways that open up discussions around digital technologies to larger issues related to values. We consider, then, whether distrust should be viewed as predictor of non-use, as Trust-TAM models propose, or indeed whether distrust figures practically in older adults' technology adoption at all. If not, then to what extent is understanding distrust important when designing technologies for older adults? In this paper, we interrogate the stated attitudes held by older adults, exploring the implicit meanings conveyed by distrust, to better understand technology non-use among older adults.

3 METHODS

Three rounds of focus groups were designed with the goal of better understanding factors that may contribute to reduced uptake of digital technologies among older adults. In contrast (but arguably complementary) to work that seeks to identify differences in cognitive ability and psychological disposition which impact technology adoption (e.g. [19]), factors of interest for this work were trust and distrust (Round 1); Technology Acceptance Model (TAM) factors including perceived usefulness, perceived ease of use, and perceived risk (Round 2); and disruptiveness to practices of daily living [10] (cf. "conversion readiness" [35]) (Round 3). The research for all three focus groups received ethics approval from Lancaster University.[2]

Participants were recruited through an established older adults participant pool maintained by researchers at the University of Dundee in Scotland (as detailed in [22]). Many of the groups targeted for recruitment were made up of retired individuals. All of the recruitment literature for this participant pool, any talks given to groups, and any discussions prior to their joining made clear that they would be taking part in research into a variety of studies about *older adults and technology*. To take part, individuals supplied their name, contact details and their date of birth, and were included only if they were over 65 years of age. While participants clearly acknowledged their age in establishing eligibility, many who joined did so for social reasons or for interest in technology and/or university research, and some even indicated to the coordinator that they do not *view* themselves as 'old'.

The coordinator managed recruitment for this specific study to meet the researchers requested participant characteristics as best as possible. Our stated requirements for each series of focus groups were: an even mix of male/female, a spread of age (from 65 onwards), and a range of technical ability. The coordinator relayed a brief overview of the project (i.e. that it was about understanding older adults' attitudes to technology to help design technologies for older adults) to those that were deemed suitable for the study, in order to determine their willingness to take

[2]Due to the ethically sensitive nature of the research, no participants were asked to consent to their data being sharing beyond the research group and, as such, the study data cannot be made openly available.

part. As noted in Dee and Hanson [2016], there are practical limitations to the representativeness of this particular participant pool across age, gender, socio-economic status, race, living situation (e.g. independent vs. care home), and (dis-)ability. In coordinating the focus groups for specific dates that were mutually acceptable for the researchers and the participant pool coordinator, diversity considerations were traded off against participant availability. The numbers requested for each round were as follows:

Round 1 Five 60-minute sessions with 3 participants each;
Round 2 Three 90-minute sessions with 4 participants each (must have participated in Round 1);
Round 3 Three 60-minute sessions with 3 participants each (must have participated in Rounds 1 and 2).

Participants were thanked for their time and received a £10 gift voucher for each round. In keeping with inductive research approaches, the focus and plan for each round was not determined in advance. Instead, each was determined in response to questions that emerged during prior rounds.

3.1 Round 1: 'Trust'

Five 60-minute sessions were conducted with a total of 14 participants. Although 15 participants were recruited for Round 1, one participant was unable to attend the session, making four groups of 3 and one group of 2. Participants included 8 women and 6 men, ranging in age from 66 to 86 (mean age 73; median age 72.5). The aim of this round of focus groups was to explore which digital technologies were trusted or not trusted, and how participants justified those assessments. We were seeking in particular to develop an understanding of how this demographic differed in comparison with younger demographics in terms of a) their degree or quality of trust/distrust in digital technologies, as well as b) the types of technologies that were trusted/not trusted (cf. [47, 71]). Further, we sought to understand how informed (and rational) participants' evaluations of technologies' trustworthiness were (cf. [80]).

A set of questions was prepared in advance of the focus groups to guide a semi-structured conversation. We used antinomy, or language contrasts, as a way of opening up the conceptual deployment of trust vs. distrust. To start, participants were asked what they used the Internet for; followed by what they would *not* use it for. The latter was used as a springboard for further probing about what participants attributed that distrust to (e.g. believing the system/service is inherently untrustworthy, or the organization providing the system/service is untrustworthy, or they as users are untrustworthy). They were also asked to reflect on how the services they did trust differed from those they did not trust. Several questions were designed to help determine whether their trust in digital technologies has changed over time, and the direction of that change. We also asked participants to rate (verbally, rather than numerically) their general level of trust in the Internet, how risky they thought it was, how useful they thought it was, and whether they felt they were conscious of these considerations when engaging with digital technologies. We also asked about measures taken to protect oneself online, and what specifically they thought they needed to protect themselves from. We asked whether any friends or family members were trusted to conduct activities online on their behalf, and whether they had shared their passwords with these individuals. In cases where online banking did not naturally arise as a topic of conversation, we specifically asked about their trust in online banking and whether/how they thought online banking differed from other online services in terms of their ability to trust it.

3.2 Round 2: 'Beneficiaries'

Three 90-minute sessions were conducted with a total of 10 participants (with 2, 4 and 4 participants respectively; two were unable to attend in the first group; group compositions varied from Round 1). Participants were drawn exclusively from among those who had participated in Round 1, and included 6 women and 4 men, ranging in age from 68 to 86 (mean age 74; median age 73.5). The aim of this round of focus groups was to determine how 'rational' participants' decisions to use or not use digital technologies are. Drawing from existing Technology Acceptance Model (TAM) literature [6, 20, 25, 33, 49, 65], we sought to disentangle factors such as perceived usefulness, perceived ease of use, and perceived risk and their impact on likeliness to adopt. The format of the sessions consisted of a combination of quasi-survey, group discussion, and group exercises.

Each group was asked about five technologies. These varied across the groups, and were chosen to represent a spread of consumer services, government services, health services, transportation services and information services. All groups were asked about Amazon, Google (search engine and maps), and sharing health data to the government (e.g. care.data [57]), which were of particular interest to us. In addition, to gather responses to a wider range of technologies within the confines of a 90-minute session, Group 1 was asked about loyalty cards and activity trackers (e.g. Fitbit); Group 2 was asked about Uber and online banking; and Group 3 was asked about health trackers and home energy sensors (e.g. Nest).

To start, participants were asked to rate 'how valuable' these five technologies were, and 'how much effort it took/would take to learn to use them' using a 5-point Likert scale. Participants then shared their scores with the group, and discussed their reasons for scoring them as they had. To get a better sense of how participants were interpreting 'value', and to allow for conversation beyond the chosen technologies, they were then asked to discuss (briefly) technologies they considered 'most valuable' and what characteristics made them so valuable. Next, the group was asked to list people, organizations and businesses who 'benefit from you [the participant] using the technology.' Participants were then instructed to rate the five chosen technologies in terms of 'how risky' (1–5) they thought each was, and 'how likely they were to use it' (0 for 'I have tried it and won't use it again'; 6 for 'I will continue to use it'; and 1–5, very unlikely to very likely). We purposely left the interpretation of 'risky' up to the participants, allowing for them to articulate how they felt risk applied to a given technology. Participants were again asked to share and discuss their scores as a group. We then returned to the list of beneficiaries and guided discussion around additional beneficiaries to consider, what they might be gaining from users' data, and possible risks to privacy. Finally, we offered participants the opportunity to re-score the technologies for 'riskiness' and 'likeliness to adopt.'

The inclusion of a researcher-led discussion about beneficiaries was a spontaneous adaptation to the plan. We had anticipated that participants would be better able to list various parties that might gain from their adoption of technology—that this was part of their calculation of potential risks, and part of their understanding of why they are so strongly encouraged to adopt digital technologies. When it became clear that participants were not used to thinking about what other parties gained from their use of digital technologies, we attempted to prompt productive thinking in this direction, but found that ultimately we (the researchers) were generating much of the content regarding both beneficiaries and benefits. Recognizing that we had provided additional information that might influence people's perception of risk (the discussion focused largely on data brokering practices [39]), we were curious to see what effect this had on participants' risk scores and whether heightened perceptions of risk led to reduced likeliness to adopt; hence the final stage, the re-scoring of these two columns, was also adapted on the fly.

3.3 Round 3: 'Practices'

A further three 60-minute sessions were conducted with participants who had attended both prior focus groups. One male was unable to attend, making the group sizes 3, 2 and 3 people respectively, comprised of 6 females and 2 males, ranging in age from 68 to 86 (mean age 73.38; median age 72). Group compositions were varied again to accommodate participants' individual schedules. The aim of this round of focus groups was to understand some of the practice level (cf. [24, 75]) implications of adopting new technologies, to determine how disruptive adoption of new technologies may be to older adults' lives and explore whether anticipation of this disruptiveness is a factor in resistance to or non-use of technologies. The sessions were far less structured than Round 2: participants were asked open ended questions and were encouraged to discuss topics of their own choosing, including reflecting on their experience participating in the three rounds of focus groups.

Discussion began by asking participants to list some examples of 'things you do now with digital technology' that were formerly done via other means. This shortlist was used to guide discussion around questions such as:

- What has changed in your life as a result of X technology?
- What do you use X technology for, and how might that be different from what you used to do before you used it?
- How has X technology changed how you accomplish goals throughout the day?
- How hard was it to learn to use X technology?
- How easy it would it be to stop using X technology?
- Why wouldn't you want to use Y technology?
- What do you anticipate might change if you use Y technology?

Participants nominated a surprisingly diverse range of technologies for discussion, including common ones such as mobile phones/text messaging, computers (in general), email, Skype, Facebook, Google, iTunes, Youtube, online banking, online shopping, online medical information, and digital photography; as well as more unexpected ones such as Moonpig, Doodle Poll, Ravelry, 'catch-up' television (e.g. BBC iPlayer), online recipes, computer chips in cars (e.g. service warnings, cruise control), and online booking systems (e.g. for exercise classes).

3.4 Analysis

3.4.1 Focus Group Transcripts. The focus groups were recorded using a Livescribe Smartpen and manually transcribed. Participants were assigned an anonymous identifier (PX) in Round 1 in the order they spoke, which remained their ID for the subsequent rounds. The manual process of transcription was an integral stage in the analysis, as emerging insights were captured while transcribing alongside responses that sparked the insight. Notes were also made in the transcripts to mark passages that pertained to insights discussed between the researchers during the focus group debriefs, which also formed the basis of questions explored in subsequent rounds.

While superficially similar to grounded theory approaches to qualitative data analysis [18], the next stage of our analysis was primarily organizational, rather than formative; i.e. responses were clustered into themes in order to be able to find related responses to a topic to cite in the write-up stage. (That being said, the process of sifting through and clustering related passages played a key part in enabling the solidification and evolution of understanding about the content of the focus groups.) Recognizing that responses from one focus group often contained relevant insights for the topic of another focus group, excerpts from the transcripts were grouped into themes based on the aims of each round:

- How participants articulated trust; and when trust appeared to be salient (Round 1 themes);

- How participants articulated value and risk; and how they reasoned these factors (Round 2 themes);
- Participants' descriptions of habit or daily practices (Round 3 themes).

In clustering excerpts, further themes were identified spontaneously, and sub-themes were identified within the initial themes. These excerpt clusters were modified in accordance with our evolving understanding of the findings from the focus groups, in keeping with constructivist grounded theory and discourse analysis, until we felt ready to write up the findings. After completing a draft, we sent the paper to participants for comment, encouraging them to inform us if we had misrepresented them in any way. There were no reported disagreements with our analysis.

3.4.2 Round 2 Survey Analysis. The hand-written quantitative survey responses from Round 2 were were coded into a spreadsheet consisting of scores for:

- Use: 0 = I have used it and now I won't use it anymore
  1 – 5 with 1 = not likely to use, 5 = very likely to use
  6 = I already use it
- Value: 1 – 5 with 1 = not valuable, 5 = highly valuable
- Effort: 1 – 5 with 1 = low effort, 5 = high effort
- Risk: 1 – 5 with 1 = not risky, 5 = very risky

For both Use and Risk, ratings were obtained both at the beginning of the focus group (Use1 and Risk1) and at the conclusion of the focus group discussion (Use2 and Risk2).

To help understand how the factors of value, effort, and risk influenced participants' use of technologies, we analyzed the pairwise data for each participant, across all technologies. Thus, we do not provide separate measures for the various technologies considered, but rather provide here a sense of these relationships overall. We conducted two sets of analyses. The first was to determine whether there were any changes in attitudes following the discussions; the second was to determine associations among the four factors measured.

Given the scalar data collected, non-parametric tests were used. The first analyses used the Wilcoxon Signed-Rank Test for paired two-sample testing to consider whether participants changed their scores on Use or Risk following the focus group discussions. The medians for both Use1 and Use2 were 5. The Wilcoxon Signed-rank test showed a nonsignificant change (W = -5), with so few people changing their responses that a z-score could not be computed. In contrast, the medians for Risk1 and Risk2 (2 and 3, respectively) differed significantly. The Wilcoxon Signed-rank test indicated an increased perception of risk following the discussion (W = -91, Z = -3.16, $p<0.01$, two-tailed). In sum, our participants did not appear to change their likeliness to use a technology following the focus group discussion, despite their perception of increased riskiness of the technologies.

To measure associations, Spearman rank-order correlation coefficients were determined for the four factors for the paired rankings of each participant. The results are shown in Table I. Not surprisingly, there were significant correlations of scores for Use1 and Use2 as well as for Risk1 and Risk2. Of more interest were the significant positive correlations between Value and Use. These correlations indicated that participants were more likely to use technologies that they rated of high value.

Also of interest were the significant negative correlations between Use and Risk. These indicated that our participants were less likely to use technologies that they perceived as risky.

We note that given the small sample size, these analyses were conducted for indicative purposes only, to be explored further in future work. They do, however, give some insight into potential associations of interest, to guide our inferences from the discourse analysis.

Table 1. The Spearman rank-order correlation coefficients for N=50 (10 participants on 5 technologies). Significance levels are indicated (*<.05; **<.01, all two-tailed).

	Use1	Use2	Value	Effort	Risk1	Risk2
Use1		.99**	.53**	.18	-.19	-.32*
Use2			.51**	.16	-.19	-.31*
Value				.25	-.15	.00
Effort					.04	-.05
Risk1						.60**
Risk2						

4 RESULTS

Below we report on the qualitative data captured in the focus groups. We focus on the ways that participants articulated their trust or distrust, and identify three categories of concern in which the concept of trust emerges as it relates to digital technologies, namely privacy, confidence and power. Then we explore how distrust manifested, and whether there was evidence to support the hypothesis that older adults' lack of trust in digital technologies contributes to their reduced uptake of these technologies.

4.1 Invoking trust

Our interest in trust is not in defining or redefining the term. Instead, we focus on trust as a common "vernacular" [31], a concept that is deployed in certain contexts to communicate a feeling that is universally understood. In line with work such as Lagerspetz's [2014], we were interested in the agency of the terms 'trust' and 'distrust', i.e. the reason they may have been deployed. As we describe below, we found that older adults cited distrust as a means of communicating that "important matters are at stake" [31, p. 311]. Distrust in certain digital technologies was *felt* (we have no reason to doubt people's sincerity in describing their feelings as distrust); but distrust was also *used*. Specifically it was used to indicate the violation of one's values, and enabled older adults to take quasi-political stands against trends that threatened longstanding notions of privacy, fairness, and social responsibility. Below we explore three 'important matters' that are ostensibly at stake in engaging with digital technologies as evidenced in participants' deployment of trust/distrust.

4.1.1 Privacy. Participants were able to cite reasons for not trusting digital technologies across the board, namely that they were not able to understand, interrogate or influence the uses their data was being put to. For example, rather than finding targeted ads useful and relevant, their trust in the digital enterprise was undermined (minimally if broadly) when they were unable to trace the source that leaked information to advertisers:

> P6: "Before my son-in-law killed ads, I used to get, this was on Google, I kept getting people who wanted me to deal with my wrinkles." [laughter]
> P8: "Oh, they're rude!"
> P6: "So they obviously knew!" [laughs/laughter]
> P7: "It's amazing, isn't it, that they just know!"
> P6: "I don't know what I would have put in, anything, that said I was 'old,' but they seem to know."

Even more so, participants were wary of their data being used to target them for scams. One participant recalled an instance of having just completed his taxes and then receiving a phishing email about a tax rebate:

> P9: "[I]t's like somebody knows what you're doing... [An email] comes in and you think, 'They knew I was looking at that'... That's the bit that's unsettling: that somewhere there's a record of what I was doing– or not so much the record of what I've been doing, but the fact that somebody is accessing that and using it to try and [scam me]."

And when asked about being willing to share personal health data for the purposes of improving healthcare, a participant replied rather sagely:

> P2: "They might not– in fact, I *doubt* that they'd exclude your date of birth, and that's quite significant, don't you think? They might not have your name, your address, your national insurance number, but if they've got your date of birth you can be looking at age sections, and it's amazing what you can track from one bit of information like that."

Notably, confidence in the technology functioning reliably did not seem especially salient to these participants' invocation of 'trust' (cf. [50]); it is the functions themselves that are thought to be untrustworthy because they fail to align with pre-existing cultural norms. Declaring distrust in these technologies is, therefore, at least as much a *moral position* as it is the articulation of generalized feelings of uncertainty regarding the consequences of one's digital activities. The two are intermingled: distrust being colored by, instantiated by, and in some cases entrenched by feelings of defiance at a perceived loss of privacy as a cultural value; and the consequences of the loss of the shield of privacy are uncertain, arousing distrust. What we see in participants' responses is that one's distrust is at least partly justified by concerns about the future of privacy:

> I: "Do you think your level of trust in technologies has changed at all over the course of time? Do you trust things more, do you trust things less?"
> P4: "I think I trust things less."
> I: "Trust things less. As what happens?"
> P4: "Well I said earlier about, you know, information being passed on to other people and you don't really know who is looking at what anymore. And it's quite scary. And I just find that, you know, I think our lives now are becoming open books to everybody."

Participants appear to be identifying a "misappropriation" of the domains of public and private as they have come to understand them [31, p. 315]—a fundamental shift that provokes instinctual moral opposition. As Nissenbaum notes, technologies that misappropriate in this way "are experienced and registered as threats to and violations of privacy not only individually, case by case, but in aggregate amounting to a social crisis, a watershed: privacy itself is under jeopardy... as a general societal value" [58, p. 6].

And this is why it matters—why it is relevant to these focus group discussions of trust—that Facebook users so willingly share personal details on publicly viewable pages; namely that they are unwittingly complicit in normalising the erosion of privacy. It plainly bothered a significant portion of our participants:

> P3: "I can't understand people living their lives on Facebook. Yeah, a lot of people do."
> P6: "I recently joined Facebook and wished I hadn't... I really don't want to be scrolling through everybody's what they think today and what they think yesterday. I've only got two friends! [laughter]... One of them keeps putting up photographs. Oh! [grumbles]."

It was a particular affront for one's private moments to be made public when consciously, actively, not endorsing this trend:

> P11: "Social networks…I despair of these things, I really do. And it *bugs* me when I end up with my face on them."

It is easy to overstate the degree of distrust that participants expressed around data sharing (we will return to this in Section 4.2). But so too it is easy to mistake older adults' rejection of social media as passive disinterest (cf. [42, 85]), and unrelated to distrust. We found that non-use of tools like social media—sites where the blurring of the public and private spheres is perhaps most salient—is like much non-use, "active, meaningful, motivated, considered, structured, specific, nuanced, directed, and productive" [70]. We have come to understand that non-use can be a form of strategic opposition to specific features of digital technologies; and that this opposition is not principally driven by fear of the consequences of data sharing so much as by unease about the 'new normal' in which details about one's private lives are increasingly captured, shared, and traded without truly informed consent.

4.1.2 Confidence. One of the strongest themes to emerge in these focus groups was feelings of anxiety when engaging with, or considering engaging with, (certain) digital technologies—a very well documented phenomenon [43, 61] which does not appear to be diminishing among new cohorts of older adults with prior experience of computing technology in the workplace. For some this anxiety was generalized to 'the internet' or even 'computers', tinging all digital engagements with fear:

> P3: "Although I use the computer, I do find it quite frightening. The reason I find it frightening is that I don't understand it. And I don't know how to put things right. If I can understand something, I can work out how to put it right. But I don't understand it…I think for me it's a confidence thing. Because I used to work with computers…The difference was, I was taken away and I was given *training*. So I knew how to use those systems. Whereas at home, you go to a shop and you buy a computer, who shows you?"

We see in this and similar quotes that anxiety originates from a perceived (perhaps real) lack of conceptual grounding needed for operating digital technologies proficiently [37].[3] Learning how to do new things with a computer requires a certain amount of prior knowledge—a conceptual map of how the technology is working [59], to which new learning can *attach*, as it were—and older adults simply do not get this kind of training after they exit the workforce [43]. As a result, they lack confidence [55], and are apt to assume that although the technology itself may be trustworthy (i.e. in the 'trust in technology' sense [50]), they, the operators, cannot be trusted to use it. We see some evidence of this on our participants' responses, e.g.:

> I: "So, online banking, you think it's super risky?"
> P14: "No, I think, if you can operate it. *I'm* risky."

Arguably, although "confidence" may be used synonymously with "self-trust", lack of confidence is not a trust issue *per se*. Principally, feelings of self-doubt point to instances of "situated elderliness" [11, 73] (or what we prefer to call 'situated aging')—encounters that make one feel old by making one question one's ability to function in contemporary digital society. When new technologies disrupt well-practiced (in this case, often over *decades*) ways-of-doing and make older adults feel newly incompetent, it is perhaps natural to associate that seeming reduction in capability with the process of aging itself—as aging is otherwise associated with the loss of physical and cognitive capability. We found that participants assumed (i.e. took on) old age when characterizing their self-doubt in using digital tools as stereotypical 'old person behavior' (e.g. quirky insistence on

[3] As Beimborn et al. [2016] have argued, "the assumption that older people are always less competent technology users" can be understood as a social script. This is one component of the dominant cultural narrative pertaining to older adults to which our participants seemed to defer in rationalizing their non-use.

routine and habit). For example, when asked why she still uses her paper diary (calendar) when she has a smartphone, the participant's response was,

> P9: "I think it's just habit. It's a small thing and you always just write in it quickly…I find it's quicker just to open the page and just put 'dentist, 10' and the date, than get the phone out…, go through all this. So it's quicker for me."
> P10: "We're just creatures of habit." [laughter]
> P9: "I should think so, because I've done that for years! And then all of a sudden to be without your paper diary!"

P11 then interjected: "This is a woman who does all her banking online with about four or five banks, but has it all in paper form. For backup." The interviewer probed further:

> I: "So a lot of people have talked about having these paper backups and paper archives, for banking, for example. Have you ever needed that for anything? Have you ever found it useful to have?"
> …[Silence; then laughter.]
> P11: "It helps if the table leg's a bit short." [laughter]
> P10: "Well, if the computer was to just go, Fffsht!—blow up." [laughter]
> P11: "I think it's just a comfort blanket."
> …P10: "But I'd imagine that youngsters who have always sort of been into computers and their iPads, to them they wouldn't see the benefit of having a paper backup, because they wouldn't have been used to it. I think it's what you're used to. And I think as you're older, you like to feel secure because it's something you know. The newfangled stuff is good, but, I think that's part of it."

In this excerpt, situated aging is evident in P10 seeing herself as acting 'like an old person' when she engages in patterns of behavior that were once necessary but are now ostensibly made redundant by digital technologies. Further, she may be hinting at a lack of comfort and/or confidence with the new digital practices. Interestingly, that lack of confidence and situated aging can become entangled with distrust in a diffuse way, *beyond* feeling a lack of self-trust. The omnipresent and ever shifting risks of making a mistake produce doubt about the trustworthiness of digital technologies as a whole:

> P6: "Well I never was very trusting. [My level of trust] certainly hasn't *in*creased. I think the more I hear of what goes wrong with some people the more I *di*strust it."

In addition to older adults' ostensibly greater likelihood of user error (as alluded to in the above excerpt), the fact that older adults lack conceptual grounding is also implicated in this diffuse distrust. One participant explained her potentially irrational feelings of distrust by way of analogy:

> P4: "Many years ago,…in the 60s, I was a district nursing sister, and going around to patients then and the television was new technology. And I remember all these old ladies– well, people, getting dressed up to watch television, for a start– and always having to cover their knees with a bit of blanket in case the man [on the television] could see out. So we've come a long way from that new technology. It's understanding. As I said, I don't understand Facebook. So it's understanding how those people can't see up your skirt."

It seems, therefore, that a certain amount of foundational knowledge is a prerequisite of being able to trust—both because older adults are aware that they may not be capable of gauging whether their trust is well-placed without greater knowledge of how it works, pitfalls of use, and consequences of mistakes; but also because knowing the answers to such questions can dampen distrust by limiting nervous speculation.

Potentially more than the lack of knowledge itself, we find that the lack of routes to gaining this knowledge is an 'important matter' which may be articulated as distrust. In short, we interpret the casual dismissal of unease with digital technologies as simply "habit" belies what is essentially a moral objection to the technical demands being placed on older adults. A recurring theme within the focus groups was that participants felt that at this stage in their lives they are entitled to a well-deserved break, e.g.:

> P4: "I think our generation have seen such an explosion of technology, and it's very hard to try and keep up with it, and embrace it, really."
> P10: "I think once you stop working, you're more inclined not to bother so much. I think you find when you're working you're forced to keep up with [it]. Once you retire you find you're a wee bit–"
> P4: "You worry about cats and booking in [to exercise classes]. [laughs]"
> P11: "The other thing– I was involved in computing and all this stuff for 30-odd years, and when I retired I thought, 'That's it! I am having no more to do with it.' Because every year it changed, and you had to keep learning new stuff…And it's not as if I was sick of it…but I thought, 'When I retire I'm just going to relax, and go back to wooden spoons."'

Instead, what our participants find is that they must exert a fair bit of effort maintaining technical proficiency amid the operating system updates and continually changing landscape of digital technologies, or risk being left behind. (Note that there are narratives around what it means to 'age successfully' that include notions of needing to keep up with technology, which presumably heighten the pressure to maintain technical proficiency.) It is possible that our participants object to the implicit conclusion that they, themselves, are in need of upgrade (cf. [74]), and object to digital technologies as the force that has aged them prematurely. They understand that online banking and online-only government services are coming, and may soon make their familiar practices obsolete: "So I think what they're doing is they're driving everybody to get [a banking] account online" [P1]. The fear is that this push will come before they are ready, and that they may sink rather than swim.

> P7: "I worry about internet banking from the point of view that the banks are closing now…And I think, 'Is that the way forward now? We'll all go internet banking now?"'
> P6: "[I hope not.] Because I don't want to do it, or be forced to do it."

> P14: "[I won't use online banking] Because I'm incompetent when it comes to using technology. I can't even use a mobile phone. Truly. I have some mental block."

So while our participants do struggle with lack of trust in their technical capabilities, they seem to view this struggle *through the lens of aging*[4]—i.e. that it is culturally understood that being "older" means it is harder for them to keep apace with changes in digital society. As such, this serves to position technological change as being in conflict with values such as taking care of elders. In other words, by making the case that they cannot be trusted with these technologies *as a natural consequence of aging*, they are making the case that those who design these technologies ought to be considering the burden being placed on older adults and be more accommodating to their diminished resources (time, energy) to invest in learning to use these technologies.

4.1.3 Power. One final invocation of trust was pervasive but largely implicit, namely distrust in the digital economy. Participants expressed concern that the immediate benefits brought by digital technologies are leading to the death of the high street (a.k.a. main street), unemployment, and further consolidation of wealth into the hands of corporations. In adopting digital technologies,

[4] And/or being characteristic of a particular stage of life, e.g. post-retirement.

they are mindful of the negative impact of that adoption on other members of society. As one participant explained,

> P12: "We don't like to be doing things that is going to lose work. 'Cause where's the work going to come from for my grandchildren?... [I]t's not going to affect me, really. But it's going to affect your neighbour. So that's– we're making a decision for somebody else."

In several instances, participants directly or indirectly attributed loss of jobs to digital technologies:

> P7: "I come here to the sports facility, and they had, actually, a delightful girl who must be the brightest person at 7:00 in the morning to answer the phone. So you'd ring her and she was always bright and pleasant and cheerful. Well now they've got an app...But I did think, 'What happens to this delightful girl who answered the phone? Is she going to lose her job now because we've got this?'...I know that happened at the railway station. [I got help from a delightful guy who said,] 'This is the last time I'll be doing this. I've lost my job, because people book their trains online."'

> P2: "The iPod is fantastic...I don't use [iTunes], because I don't like giving Apple money, but I use charity shops and second hand shops...I decided that, as I understood it..., Apple had bought the rights to certain huge areas of music and therefore they could allow you to buy it from their store, and that was fine; *but* I felt that there were other people that were being cut out of the process, and that was, say, charity shops, but also our great second hand shop, [Name]. And I think at one stage possibly artists as well were losing out on royalties?"

The older adults in our study described instances of trading off convenience when they were concerned about the "killing off of real life, the real world" [P6]. They make special trips to the bank, even when they could conduct a transaction through their online banking account, to help keep the bank in business for their friends and peers who rely on that service—or perhaps, as a protection if and when they are no longer able to maintain proficiency with digital banking themselves. Similarly, they insist on going to the post office to pay their road tax rather than paying online—not because of any lack of trust in the online system in terms of it working: "No, I just think I want to keep the post office open" [P1].

As has been documented elsewhere (e.g. [79]), older adults frequently invoke distrust in the context of online banking and financial transactions. Indeed, we found that the way our participants invoke distrust is as if to draw a line in the sand: they will not be convinced. For example, P5 declares firmly, "I don't do internet banking. I don't have faith in the system, and I will always go into a bank;" and P10 says, "I don't do banking, or anything like that on it. That's one thing I don't believe in."

There are many reasons why online financial transactions in particular provoke distrust, but one that we have not seen discussed in the literature that appears relevant is moral outrage at a perceived lack of care for and protection of the 'little guy'—at 'stacking the deck' in favor of big, powerful corporations. Participants felt, "I've worked hard for my money" [P3], and if their account is hacked, the bank is unlikely to look after them. And if one falls victim to a scam, for example, the credit card company makes it very difficult to reclaim losses, as one participant explained as her reason for not using (and not trusting) online financial transactions anymore:

> P4: "Oh it took *months* before I got my money back...You're protected, they say,...and you should get it back, but they're trained not to give it back to you. So they just

> wrapped me up in all these sort of awful questions and things to do and I was sending them letters…I wasn't sleeping and everything."

Distrust of data sharing practices are renewed and recharged in this context. For example, the prospect of sharing health data to the government is risky when the government cannot be trusted not to sell that data to insurance companies. Deliberating the idea of a participating in the digitization of the National Health Service, one participant responded,

> P8: "Would [insurance companies] have access to– see that would be why I find it risky. I don't *want* to. Why give *them* more access and more money to make it harder and harder for *us* to get insurance?"

We found, therefore, that technology non-use is one way for our participants to exercise what little power they have to affect the perceived imbalance of wealth and power in society. Invoking distrust, then, may be a way of taking a political stand minimizing their political risk. Distrust of particular services (such as online banking) is evidently not contained within the context of the usability of the individual system; it is not rooted in interactional issues. Instead, distrust in particular technologies arises when they are seen to exacerbate larger societal problems, namely the erosion of social safety nets and the loss of the value of community (i.e. looking after one another). But crucially, participants linked their stated distrust to their status as an 'older adult':

> P4: "I find that young people just don't seem to–"
> P8: "They're more trusting."
> P4: "Yeah. It's part of their growing up and their acceptance. So they don't challenge or think about it, they just go on the Internet and do everything."
>
> P7: "Do you not think, too, at our age– I mean young people are marvellous. Because they're not frightened of any of it."

In doing so, participants were able to make their opposition to these forces understandable, as well as indisputable, closing down the need for further inquiry into the matter. In other words, age is used as an "accountably sufficient" [32] reason for non-use. Offering a culturally understood—if dubious—stereotype (i.e. older adults don't trust digital technologies) as a rationale provides cover for insinuating more politically risky and less easily articulated opposition to digital technologies.

4.2 Doing trust

Hearing our participants freely articulate the various rationales for not fully trusting digital technologies, we wanted to know what they *did* with this distrust. How did it affect their engagements with these technologies, and in particular, how much was distrust a factor in adoption or non-use?

We were admittedly surprised to find that distrust did not appear to correlate with non-use. We must stress again that we were not aiming to produce statistically valid results from our quasi-questionnaire (this was intended as a discussion prompt); but the scores participants gave for the "likeliness to adopt" were high (highest possible) for many technologies they claim to distrust, as well as for technologies they scored high for "riskiness". In the Round 2 focus groups, even after deliberately priming participants to think of all of the risks associated with digital technologies, and educating them about risks that they had not been aware of, especially for technologies they were less familiar with, in only one instance did this cause participants to lower their "likeliness to adopt" score when given the chance to re-score it.[5] The exercise did seem to impact participants' perceptions of risk, but did so without negatively impacting likely adoption. Illustrative of this

[5]Oddly, in three instances participants' likeliness to use rose by a point, even when in two of these instances their riskiness score also increased by one. We can only guess this is due to having heard from other participants in the focus group about additional benefits the technology brought to them, making adoption seem more enticing.

phenomenon, P14 proclaimed at the end of the focus group, "I thought [Google] was risk free, but now my eyes have been opened! [laughs];" but P14 also said he would, of course, continue to use Google.

One interpretation of these findings could be that participants' stated distrust was mere posturing—that they were simply enjoying a good moan. Instead, we assume there are two more likely causes for this discrepancy: 1) participants did not perceive real choice in their adoption behavior; and 2) adoption behavior is not reasoned, or at least trust/distrust does not actively feature in that reasoning.

The first of these relates to the "perceived behavioral control" dimension of the Theory of Planned Behavior, introduced into the Theory of Reasoned Action model to better account for discrepancies between attitudes and actions [1]. In other words, the ability to act in line with beliefs is contingent on the freedom to do so. Here it is the technology itself that appears to be the main controlling force for participants, simply by being useful and convenient:

> P12: "It would be hard, actually, to change, if you've been using something and you see the benefits."
>
> I: "[Knowing what you know now,] are you going to not use Google?"
> P2: "Oh, no– life without Google!"
> P10: "[Even with the risk factor], lots of people would still use these things because it's convenient."

As one participant explained, "You shouldn't have to give up things because of people doing that [selling your data or scamming you]" [P10]. The fact is, giving in to fear or distrust would be disabling for these participants:

> I: "But you don't seem to be worried maybe so much about your information, and sharing it with others, because you mentioned DVLA[6] selling information to insurance companies, and yet you still go online."
> P2: "Well yeah, I do, because there's sort of an inevitability about it. Do I stay a dinosaur? Because I enjoy– in fact, if anything happens to the computer it is as if– I mean I'm *horrified* at my reaction– it's as if I've had my arm cut off! I've got to get to, you know, the computer place up the road and find out what's wrong. I never anticipated that I would be *dependent*. That's how it feels. That this is a major source of communication with the outside world."

This dependence creates tensions between the instinct not to trust and the desire to trust technologies that provide important benefits, as succinctly captured by one participant's response to being asked whether she trusts online banking: "Well I use it, therefore I feel I have to trust it" [P7]. When asked for clarification—"So it's *worth* it to trust it, because of the benefits you get?"—she replied, "Yes, yes. That's *exactly* how I feel." So in some ways, it is inconvenient to focus on distrust, and makes more practical sense to "put the fears to the back of your mind" [P8]—even consciously adjusting one's perception of risk to align with one's actions:

> P7: "I think it is [more risky now we've talked through it], but we still have to live with it, we still want to use it, so that's why I'm giving it a 4 [rather than 5, for riskiness]."

In light of these responses, it is important to note that technology use is not necessarily an endorsement of its trustworthiness, and therefore should not be interpreted as such. Even tools that participants used regularly were not trusted *per se*. Rather, the benefits of certain tools outweighed feelings of distrust; or at least the perceived likelihood of negative consequences occurring (the risk)

[6]The DVLA is the United Kingdom's Driver and Vehicle Licensing Agency.

was deemed tolerable for technologies that were highly desirable. Conversely, when participants saw little benefit in adopting a tool, they freely cited distrust as a legitimate justification for non-use.

It is tempting in reporting on these variables to assign greater reasoning to these decisions than is warranted. To be clear, in saying that benefits outweigh distrust or benefits outweigh risks we are not meaning to imply that these factors are consciously weighed, or that the weightings themselves are rational. Quite the opposite: we found evidence to suggest that this cognition was very foreign to our participants. Participants enjoyed the focus groups precisely because they challenged them to think in new ways: e.g. in explaining why she was looking forward to the next focus group, P7 said (as did others in different words), "It makes you think, doesn't it?"

In hindsight we recognize that the focus groups, which were foregrounded with the objective of shaping technology design based on participants' feedback, provide the ideal (and possibly singular) moment for our participants to influence the design of digital technologies. Because this setting may have elevated feelings of distrust to greater significance than is typically experienced by participants, we feel it is important for ours and other studies to acknowledge the influence of the interview process on the interviewee's responses so as not to overestimate the role of trust/distrust in decision making. Simply put, asking participants to talk about their trust in technology shifts their *phenomenal field of attentiveness* [24] such that they are consciously aware of a concept that largely does not factor in to their lived engagements with technology. Nonetheless, this does give us new insights into the supposed decision making behind use or non-use. As P10 explains, "I think loads of people, you just see something, you fancy it, you like what it's going to do for you, and you just buy it, and use it, and never think about what are the chances…." This is echoed by P4, who notes that rational deliberation frequently loses out to desire:

> P4: "I think sometimes I feel a bit guarded. Should I put that? Who else is going to get this?"
> I: "Right, okay. So you do think through these things."
> P4: "Sometimes, yeah. It depends how much you want the book [in the case of Amazon], or whatever. [laughs]"

This contrasts with some popular rational conceptions of trust (e.g. [3, 67]) which consider trust to be something that people arrive at through reason. But as Harper notes, "One sometimes reasons about some things. But one is mostly getting on with whatever it is we are getting on with… Trust doesn't pertain in this modality; it is irrelevant. Only occasionally does trust, the question of it, the examination of, some doubt about it, come into play. A concern with those latter moments should not lead us to ignore the character of other moments, nor should it tempt us to color those other moments as being constituted from the frame of trust" [31, p. 313]. As we see in participants' responses, distrust is found when attention is focused on it, but fades from view when practical decision making occurs:

> P8: "We do always want to have things that make our lives easier, and it does. I mean, despite– obviously, there's still the fear, being untrusting, you know things can go on, people can hack– but I just kind of put that aside."

We had admittedly anticipated greater reasoning than we found. In planning Round 2, our working hypothesis (which in retrospect seems naïve) was that older adults choose not to use technologies when the benefits of adoption align better with other people's values and agendas than their own; i.e. that if other people are perceived to gain more by them using technologies than they feel they gain themselves in using them, they would be less likely to adopt. The thinking was that while discourse around non-use tended to project certain unquestioned benefits onto technologies (e.g. efficiency), these benefits may better serve companies and organizations—for

whom getting people to 'go digital' means streamlining their operations—than they do the older adult him/herself, and therefore would a) not be a convincing reason to adopt a technology, and b) may provoke opposition to being pressured to adopt a technology for another's benefit.

But we found that to the extent that our participants are reasoning about their adoption of technology, they clearly do not consider potential beneficiaries in their calculus. Asking them to list who else might benefit from them using technology—e.g. companies that might make use of their data for profit—proved a surprisingly difficult challenge.[7] This activity was such a failure that we as interviewers both listed the potential beneficiaries of the technology and provided examples of how they might benefit, rather than the other way around. The benefit of this exercise, however, was that it demonstrated that participants found it very taxing to think through the implications of use that might inform a 'decision' about the trustworthiness of a given technology; let alone being able to rationally apply that assessment at decision time, when a multitude of factors confound their thinking.

On the one hand, we may appear to be suggesting mutually incompatible theories: that individuals reason that they have little choice in adopting technology, and simultaneously, that they do not reason about adoption *per se*. To clarify, we do not believe that one's relative freedom to adopt a technology is consciously reasoned; rather, it is more likely that one simply adopts a technology at the moment it serves one's immediate aims and the freedom of choice is rationalized after the fact. In reality, to be a human in the twenty-first century, one must live with one's distrust of digital technologies; the tongue-in-cheek question by P8, "So should we just all scrap it and go back to paper and pen…[and] post?" is laughably implausible. In grappling with the prospect of using an altogether new technology with which one has not yet become entangled (such as the Nest or activity trackers in our focus groups), calculative reasoning might more comfortably apply as there is ostensibly a decision to make. But in such instances, ironically, people are least informed for the task of assessing the trustworthiness of such tools, knowing so little about how they work. It would seem that in all instances, therefore, trust or distrust are gut instincts, or rationalizations; trust and distrust are ways of communicating ease or dis-ease with technology, which may derive from essentially non-rational thought processes, and which may not pertain *practically* to use or non-use.

In summary, we found that the relationship between distrust and non-use is more complex and nuanced than existing commentaries suggest. For example, distrust does not necessarily lead to non-use, as participants frequently use technologies despite not trusting them because it is expedient to do so. And yet, distrust may be cited as a justification for non-use as a socially acceptable reason for rejecting technologies, i.e. compared to lack of interest or failure to keep up with technology, both of which bear connotations of not 'aging successfully'. In this way, referencing pre-existing (though not necessarily accurate) narratives of older adults' distrust of technology could be a way for participants to negotiate the demands on them to purchase, learn, and maintain proficiency with technology and instead carry on with familiar, comfortable practices; hence participants freely affiliate with 'older adults' in this context, whether or not they themselves feel 'old' in their daily lives. This suggests that participants choose non-use (and rationalize it with 'distrust') as a form of protest—as a way of exerting some influence over matters of concern pertaining to strongly held moral convictions.

[7]Even though our participants were generally on the upper end of technological capability than the average older adult, identifying beneficiaries and benefits was significantly easier for younger adults, which we will discuss in detail in the next section.

5 DISCUSSION

5.1 Older adults as a meaningful group

Thus far, we have limited our inferences to our participants, though clearly our interest is to contribute to understanding around how attitudes to technology affect adoption among older adults *more broadly*. We proceed with mild caution here, noting that our participants are not necessarily wholly representative of their supposed peers, and that researchers often make the mistake of thinking of older adults as one homogenous group [30, 81]. It is clear from our study that our participants do not all "share the same set of social meanings, attached to a specific artefact" (to quote Pinch & Bijker [1984] speaking of general tendencies in grouping individuals). Clear differences in the value, risk and trust that participants ascribed to various technologies[8] would seem to undermine presumed unanimity between older adults, at least at the level of individual technologies—i.e. no single type or form of technology that will be seen as trustworthy or untrustworthy by all older adults. Our work supports prior findings, however, that older adults readily self-identify as a meaningful group (cf. [34]), insofar as they assume, and use as an explanation, ostensible generational and/or age-related differences in disposition toward "digital technology" compared with younger adults.

To understand whether we have identified robust attitudinal differences between older adults and younger adults, we would need to conduct further research. At this stage, having conducted only preliminary surveys with younger adults, we have not found evidence that younger adults cite greater trust in digital technologies or less concern about risks associated with them, in contrast to our participants' assumptions. That said, we do have initial support for the notion that older adults' deployment of 'distrust' is unique in drawing attention to moments when technologies clash with strongly held (possibly generational) values; that in contrast, younger adults reserve the notions of 'trust' or 'distrust' to indicate whether, for example, a technology does what it is supposed to, is secure, and/or protects their identity. If this is borne out in future work, it would seem to reinforce our findings here that older adults legitimize their complaints about technology by linking them to old person status. It would also suggest that the concept of distrust has a particular utility for older adults, both as a means of communicating situated aging (cf. [73]) and as a way of justifying non-use in order to protest objectionable consequences of technologies.

It has been predicted elsewhere that continual technological change and age related decline will remain relevant factors in disparity in adoption rates between old and young for generations to come (e.g. [28]). Even if future work verifies these attitudinal differences between older and younger adults, we predict that today's younger adults will experience loss of confidence in technological ability as they age; that they will favor familiar ways of accomplishing their goals which are intertwined with the technology available at the time they established these practices; and that they will cling to notions of acceptable levels of privacy and other cultural values instantiated in their youth through to old age. For these reasons, we anticipate that today's younger adults will begin to rationalize non-use by invoking 'distrust' when they begin to affiliate with the category of 'older adult'. Our findings suggest, therefore, that older adults will remain a relevant group for analysis because these same factors will likely influence feelings of trust and distrust in ways that reveal key tensions that require careful consideration in the design of technologies.

5.2 Appropriateness and validity of TAM

Since Davis introduced the technology acceptance model (TAM) [20], many researchers have used it as a framework for understanding why individuals resist various technologies. That being said,

[8] In social construction of technology (SCOT) terms, this is called "interpretive flexibility" (cf. [53, 63]).

many (including Davis himself [21]) have used it only to amend it with additional factors that would seem to better account for adoption behavior, as well summarized by Oum & Han [2011]. There is some debate about how strongly perceived ease of use (PEOU) influences adoption. According to our older adult participants, rather than affecting adoption, difficulty using technology was just something they suffered through. Perhaps older adults expect new technological engagements to be difficult to learn[9], therefore there are few if any technologies that are thought to be sufficiently easy to use that it would make a difference to an older adult's likeliness to adopt it. This may help explain why, like several prior studies involving older adult participants [16, 17, 28, 51], we found perceived usefulness (PU) to be a much more relevant factor than PEOU in technology usage.

Unlike true TAM studies, the aim of our work was not to quantify the correlations between various factors and adoption behavior. It is possible that by not collecting data pertaining to other factors that may be influencing adoption—e.g. subjective norms/social influence and facilitating conditions [64, 78]; experience with technology [2, 8]; gender and health [54]; self-efficacy and peer support [35]—we missed key explanatory dynamics. And yet despite having initially intended to contribute towards efforts to enhance the TAM model with factors such as risk and trust [33, 65], and having anticipated suggesting the addition of perceived beneficiaries as a relevant factor, we have come to doubt the explanatory power of TAM for older adults specifically. Our findings suggest that it is overly simplistic to view these factors as determinative—i.e. in aggregate producing a given adoption behavior—when individuals' own ratings of these factors may be adjusted *post hoc* to align with their behaviors. More to the point, however, older adults use distrust to tie technology (non-)use to their larger societal role. Trust/distrust, therefore, is not on an equal plane with factors such as PU and PEUO, and as such does not appear to be weighed against these factors in deciding whether to use a technology.

Non-use can reveal aspects of design that are not working for a set of users [79], in this case older adults; and given that for older adults PU seems to strongly influence adoption, this would seem to support the argument for consulting with older adults about what would be useful to them in developing technologies that they are likely to use [29, 68]. But what appears to be *most* instructive for improving designs of technologies for older adults are the *instances of protest* which, perhaps due to lack of real choice in the matter, do not actually result in non-use. We suggest that the TAM focus on use vs. non-use has obscured the importance of examining moments when older adults purport to be 'not entirely happy' using technologies [P8], or 'using but not trusting' technologies [P7], or even 'having to use technologies they *hate*' [P3]. Having found that distrust arises when an individual's values come in conflict with values they associate with use of a given technology, this suggests the need for consultations with older adults about what they want from technologies to be *values-oriented* [12] to promote trust in and true *acceptance* of digital technologies.

We do not go so far as to suggest that trust-TAM approaches are entirely unhelpful. Such approaches may be explanatory when considering older adults' adoption of specific applications. Our critique is that when older adults discuss types of applications, or digital technologies more broadly, the concept of distrust is used to express bigger picture objections to the technologies which do not necessarily feature in practical decision making around (non-)use. Given that distrust in digital technologies does not necessarily lead to non-use, our worry is that the causes underlying distrust are easily ignored if designers are singularly focused on non-use as a motivator for improving designs for older adults. Particularly if distrust is seen as an irrational disposition of older adults towards technology, there is the potential for digital technologies to inadvertently sweep away the important societal values that usage of 'distrust' is attempting to highlight.

[9] As P4 confessed, her first reaction to a new technology is always to think, "Oh I wouldn't understand it. I don't know how to use it."

In summary, we are not arguing that trust is a better lens for understanding adoption behavior. Quite the opposite: we would suggest that trust and distrust as older adults use the terms are largely irrelevant to adoption behavior, at least in terms of digital technologies that are systemically integrated into contemporary life. What is important about distrust, instead, is that it indicates problematic aspects of digital technology which require critical attention and creative design thinking.

6 CONCLUSION

Throughout this paper, while our focus has been on trust (and distrust), we have not been seeking to conceptually redefine what trust is, so much as arguing for and against its applicability in different contexts [31]. We find that 'trustworthiness' is not a stable characteristic of digital technologies [63]; nor, indeed, that the 'trustworthiness' of the digital technology—in the objective sense of whether it *ought* to be trusted to do what it is designed to do [36]—is the most salient factor in people's inclination to adopt it *or* trust it. The concept of trust (perhaps particularly in the form of distrust) "allows us to make judgments, to call attention to issues, and to account for choices of various kinds" [31, p. 9]. We found that our older adult participants deployed 'distrust' to express their discomfort with certain aspects of digital society as a whole, and to object to certain aspects of a given technology that clashed directly with their values. In some cases, non-use was a mechanism for enacting distrust; though certainly not all instances of non-use were rooted in distrust, as one cannot be aware of let alone adopt everything. Likewise, many technologies were adopted despite not being trusted, in which case 'distrust' was used as a critique, as a wish for more acceptable options. In either case, therefore, distrust does not figure *practically* into adoption of digital technologies.

But distrust appears to be an important characteristic of the older adult experience with digital technologies insofar as older adults articulate their non-use through the language of distrust and understand it through the lens of aging. This does not mean that older adults experience *more* or *stronger* feelings of distrust—for example, older adults may question the trustworthiness of aspects of digital technologies that are assumed natural by younger generations, while younger generations may have more in-depth technical knowledge regarding threats to privacy or security. If older adults see themselves as being—and in practice *are*—-afterthoughts in the project of digitizing society [5, 81, 84], 'distrust' is deployed as a form of resistance that is infused with meaning. As Suchman and Bishop [74] argue, resistance to "change" can be understood as a reasonable response when that change does not represent ones' own interests, as would appear to be the case in some instances with older adults and digital technologies.

The fact that older adults do not use digital technologies to the same extent as younger individuals is often viewed as a problem. Because distrust is often cited by older adults as a rationale for non-use, and that distrust does not appear to be linked to demonstrable lack of trustworthiness in the technology itself, one might reasonably look for answers as to how to get older adults to trust digital technologies more. Unfortunately, there are no easy or obvious 'fixes' because it is not principally older adults' perception of trustworthiness that needs attending to.

Fundamentally, the implication of our study is to underscore the need for a more inclusive approach to developing digital technologies, and considering the parallel development of mechanisms for buttressing in places when digital technology creates new vulnerabilities, whether they be social, economic or technical in nature [37]. By asking about trust, we forced participants to account for their interactions with technologies, and in doing so elicited concerns about these vulnerabilities. We found, therefore, that distrust is densely meaningful, and can be looked to for guidance as to necessary course correction in the design of and/or proliferation of digital technologies. Although

distrust does not appear to negatively impact technology adoption, researchers ought to take seriously the implications of that distrust, of older adults' uneasy experiences of digital technologies, in reflecting on and shaping the future of digital society.

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